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Psychiatric framing affects positive but not negative schizotypy scores in psychology and medical students

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Abstract

When testing risk for psychosis, we regularly rely on self-report questionnaires. Yet, the more that people know about this condition, the more they might respond defensively, in particular with regard to the more salient positive symptom dimension. In two studies, we investigated whether framing provided by questionnaire instructions might modulate responses on self-reported positive and negative schizotypy. The O-LIFE (UK study) or SPQ (New Zealand study) questionnaire was framed in either a "psychiatric", "creativity", or "personality" (NZ only) context. We tested psychology students (without taught knowledge about psychosis) and medical students (with taught knowledge about psychosis; UK only). We observed framing effects in psychology students in both studies: positive schizotypy scores were lower after the psychiatric compared to the creativity instruction. However, schizotypy scores did not differ between the creativity and personality framing conditions, suggesting that the low scores with psychiatric framing reflect defensive responding. The same framing effect was also observed in medical students, despite their lower positive schizotypy scores overall. Negative schizotypy scores were not affected by framing in either study. These results highlight the need to reduce response biases when studying schizotypy, because these might blur schizotypy-behaviour relationships.

190 words

Keywords: schizotypy, response bias, self-report questionnaires, O-LIFE, SPQ, framing effects

1. Introduction

Schizotypy is a multidimensional personality construct that is argued by many to lie on a continuum, with full-blown psychosis representing the extreme end (Claridge & Birchall, 1978; Meehl, 1962; Verdoux & van Os, 2002). Reflecting patient symptoms, schizotypy dimensions consistently separate positive (magical ideation, unusual perceptual experiences) and negative (e.g. social and physical anhedonia, social withdrawal) schizotypy (Chan et al., 2016; Ettinger et al., 2014; Kwapil, et al., 2008; Lenzenweger, 2006). Schizotypy has been likened to an 'attenuated' form of schizophrenia, and therefore provides a model for schizophrenia-related cognitive and neurophysiological deficits in a more accessible, medication-free nonclinical population (see Kwapil & Barrantes-Vidal, 2015 for a recent overview). Psychotic symptoms in clinical populations are most commonly assessed through structured interviews, whereas schizotypy in the general population is most commonly assessed through self-report measures such as the Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE; Mason et al., 1995; Mason & Claridge, 2006), or the Schizotypal Personality Questionnaire (SPQ; Raine, 1991; see Mason, 2015 for a recent comprehensive overview on these and other schizotypy questionnaires). Such self-report questionnaires tap the same subjective experiences as the interview techniques used in patient samples (Eaton et al., 1991; Raine, 1991), and have good predictive validity (Barrantes-Vidal et al., 2013; Chapman et al., 1994; Gooding et al., 2005).

Given that there is a strong genetic component in psychosis, it is paradoxical that patient relatives often present with *normal to low rates of positive* schizotypy (e.g.

Appels et al., 2004; Bora & Veznedaroglu, 2007; Calkins et al., 2004; Claridge et al., 1983; Clementz et al., 1991; Compton & Chien, 2008; Katsanis et al., 1990; Landin-Romero et al., 2016; Tarbox et al., 2012). Potentially, relatives report unexpectedly low positive schizotypy scores because of a defensive response[1] tendency when asked about unusual experiences of the kind associated with the illness seen in the overtly psychotic family member (e.g. Claridge et al., 1983; Katsanis et al., 1990; Yaralian et al., 2000). This reasoning could explain why children of parents with schizophrenia (age range 9 to 22 years) show elevated positive schizotypy scores when compared with those of controls (Keshavan et al., 2008; see also Vollema et al., 2002): children might yet be free from defensive response tendencies due to a relative unawareness that one's own positive schizotypal experiences might be reminiscent of psychiatric illness.

Following this reasoning, we would expect defensive response tendencies only for high salient (positive) but not for low salient (negative) illness-associated symptoms (see also Cornblatt et al., 2003), and particularly in people who are familiar with the illness. An overproportional focus on positive symptoms would explain why negative schizotypy scores are comparable (Appels et al., 2004; Compton & Chien, 2008; Yaralian et al., 2000), or even higher (Bora & Veznedaroglu, 2007; Calkins et al., 2004; Clementz et al., 1991; Katsanis et al., 1990) in relatives of patients with schizophrenia compared to those of controls. Motivation to deny illness-associated symptoms also seems

[1] The defensive responding interpretation is speculative and made with due caution. For clarity and ease of reading, we will nevertheless use the term to describe unexpectedly low positive schizotypy scores.

understandable when negative public opinions about schizophrenia are taken into account (e.g. Turkey: Boke et al., 2007; UK: Clement & Foster, 2008).

These observations suggest that motivation to deny salient psychiatric symptoms biases self-reported schizotypy scores, just as psychological and/or financial factors seemingly distort self-report in a personally favourable direction in other domains (e.g. pain assessment: Robinson et al. (1997), self-esteem: Forsman (1993), and drug abuse: Carey (2002)). In a previous study using the Chapman scales (Chapman et al., 1976; Eckblad & Chapman, 1983), Mohr and Leonards (2005) showed in French and English speaking participants that positive, but not negative schizotypy scores were lower in a group of psychology students who were informed that the questionnaire assesses traits related to psychosis as compared to a group who were informed that the questionnaire assesses traits related to creativity. These results seem to support to hypothesis of defensive responding. The study, however, did not control for knowledge of psychosis, and could not distinguish whether the framing conditions caused defensive responding in one group (psychosis instruction) or enhanced endorsement of schizotypal traits in the other (creativity).

In two independent studies (Bristol, UK; Wellington, New Zealand), we asked psychology students and medical students (UK only) to complete schizotypy measures. We used two widely-used schizotypy measures to maximise generalizability of our findings: the O-LIFE in the UK study, and the SPQ in the NZ study. We used the Unusual Experiences (UE) factor of the O-LIFE and the Cognitive-Perceptual (CP) factor of the SPQ to assess

positive schizotypy; and the Introvertive Anhedonia (IA) factor of the O-LIFE and the Interpersonal (IP) factor of the SPQ to assess negative schizotypy. We note that the positive schizotypy construct is very similar on the two measures, but their negative constructs diverge somewhat, with the SPQ including subscales related to suspiciousness and social anxiety[2].

The questionnaires were introduced either within a creativity context, a psychiatry context, or a neutral personality context (NZ only). The first year psychology students had not yet received formal teaching on psychosis or schizotypy, while the medical students had just received a series of lectures on schizophrenia. We expected defensive responding in the psychiatry versus creativity context for positive schizotypy in both groups, but expected medical students to also score relatively lower overall on negative schizotypy (given their more specific knowledge). The inclusion of a "personality" context in the NZ study allows us to further probe the mechanism of framing. If the framing effect is driven by defensive responding in a psychiatric context (and not enhanced endorsement of schizotypal traits in a creativity context), we would expect scores in the creativity and personality framing conditions not to differ.

2. Methods

2.1. UK Study

2.1.1. *Participants*

[2] Unpublished data from our lab (N = 428) shows the correlation between the two positive subscales to be .83, and between the two negative subscales to be .76 (Hedley et al., in prep)

Of the 180 undergraduate students, 99 were first-year psychology students (*mean age*: 19.57 years, ± *SD*: 3.96 years, 64 women) without formal teaching of abnormal psychology and 81 were third-year medical students (aged 21.68 years ± 3.17 years, 42 women) who had just received two hours of lectures on schizophrenia. The medical students also received clinical training as part of hospital placements. All participants received questionnaires (see below for details) in a classroom setting (psychology students in a whole-year group lecture, medical students in three separate small group lectures with about 30 students per class). We were constrained to opportunistic sampling; therefore the experimenters were unable to control the assignment to conditions *a priori.* The questionnaires were handed out at the end of the lecture with minimal instructions; students were simply invited to complete the questionnaires on a voluntary basis. Those willing to participate filled in the questionnaires and handed them to the waiting researcher directly on completion; returning the questionnaire constituted informed consent. The study was approved by the local Ethics committee.

2.1.2. *Self-report schizotypy questionnaire*

Schizotypy was assessed with the O-LIFE (Mason et al., 1995), a validated 104-item questionnaire assessing schizotypy in terms of four dimensions: positive schizotypy is assessed by 30 items pertaining to Unusual Experiences (UE, maximum score 30, items include *'Are your thoughts sometimes so strong that you can almost hear them?'*), and negative schizotypy by 27 items assessing Introvertive Anhedonia (IA, maximum score 27; items include *'Have you had very little fun from physical activities like walking, swimming or sports?'*). Additional subscales assess Cognitive Disorganization and

Impulsive Non-conformity. As we have no specific hypotheses about these subscales we do not report them here. Participants indicate whether the given statements are true or false, and the number of positive responses (some items are reversely formulated) is summed so that higher scores indicate higher schizotypy. The O-LIFE demonstrates good test-test and internal reliability (Burch et al., 1998; Fonseca-Pedrero et al., 2015). Normative values can be found in Mason et al. (1995) and Mason and Claridge (2006).

For the purpose of the current study, we prepared a booklet for each participant that contained the instructions followed by the O-LIFE. Specifically, we added a new front page (see also Mohr & Leonards, 2005): In half of the cases, the front page contained the 'psychiatry' instructions and in the other half the 'creativity' instructions. The psychiatry condition instructions read: 'You are participating, as a healthy control subject, in a study which investigates the relationship between lateral preferences and psychotic thought in patients with first-episode schizophrenia'. The creativity condition instruction read: 'You are participating in a pilot study on the relationship between lateral preferences and personality style as a likely indicator for creativity.'

2.1.3. *Return rate and final sample*

Of the original 180 individuals returning the questionnaires, 177 responses (119 female) were available for analysis, after questionnaires with missing information were removed (see also Mohr & Leonards, 2005): 97 psychology students (68 women), of whom 52 received psychiatry framing (35 women) and 45 received creativity framing (33 women);

and 80 medical students (51 women), of whom 38 received psychiatry framing (25 women) and 42 received creativity framing (26 women).

2.2. NZ Study

2.2.1. *Participants*

In the first week of term, 697 introductory psychology students completed a set of online questionnaires (including other measures unrelated to the current study) to screen participants for future experiments. A random seed generator assigned participants to either the psychiatric, creativity, or personality framing conditions. The study was approved by the local Ethics committee and participants provided informed consent.

2.2.2. *Self-report schizotypy questionnaire*

The SPQ (Raine, 1991) comprises 74 statements to which participants agree or disagree (yes/no). The questionnaire was adapted for online presentation so that participants saw four or five statements on each screen, and responded to each with a mouse click to indicate if the statement applied to them. The SPQ has 9 subscales which make up 3 factors: positive schizotypy (Cognitive-Perceptual Factor (CP); comprised of subscales for ideas of reference, magical thinking, perceptual aberrations, suspiciousness; maximum score 33), and negative schizotypy (Interpersonal Factor (IP); comprised of subscales for social anxiety, no close friends, constricted affect, suspiciousness; maximum score 33). The Disorganised factor (DIS; comprised of odd speech and odd behaviour; maximum score 16) is not relevant to our hypotheses, and not reported here. The SPQ has good

reliability and validity across a range of countries and cultures (Fonseca-Pedrero et al, 2015; Fonseca-Pedrero et al., 2018; Fossati et al., 2003; Raine, 1991).

Participants were randomly assigned to one of three sets of instructions. The instructions for each condition read (variations between conditions in [square brackets]): "Researchers in the School of Psychology are conducting a research study on [*schizophrenia/creativity/personality*]. As part of this project, we are using a questionnaire that might help us identify [*people who are in the early stages of schizophrenia/people who are creative/different personality types*]. We are giving the questionnaire to a wide range of people so we can determine how most people respond" In the psychiatric condition only, the last statement was modified to read "…giving the questionnaire to a wide range of *healthy* people…".

2.2.3. *Return rate and final sample*

Of the 697 students who participated in the online session, 27 failed to complete all items on the SPQ, and were excluded. The final sample therefore consisted of 670 participants (479 women; Mean age 19.08 ± 3.68 years). Of these, 209 completed the questionnaire with psychiatric framing (145 women), 267 with creativity framing (197 women), and 194 with personality framing (137 women).

3. Results

Means and standard deviations in each condition for both the UK and the NZ studies appear in Table 1.

3.1. UK Study

For the O-LIFE, Unusual Experiences (UE) and Introvertive Anhedonia (IA) scores were analysed in a multivariate analysis of variance (MANOVA) with group (medical, psychology) and framing (psychiatric, creativity) as between subject variables. Because gender differences in schizotypy are frequently reported, we included it as well. There were main effects of group, $F(2, 168) = 26.084$, $p < .001$, $\eta_p^2 = .237$, and framing, $F(2, 168) = 4.712$, $p = .010$, $\eta_p^2 = .053$. Follow-up univariate tests showed that medical students had lower UE scores, $F(1, 169) = 47.802$, $p < .001$, $\eta_p^2 = .220$, and IA scores, $F(1, 169) = 4.878$, $p = .029$, $\eta_p^2 = .028$ than psychology students. The main effect of framing reflected lower UE scores for those in a psychiatric compared to creativity context, $F(1, 169) = 6.536$, $p = .011$, $\eta_p^2 = .037$, $d = .36$, but there was no significant effect of framing on IA scores, $F(1, 169) = 2.885$, $p = .091$, $\eta_p^2 = .017$, $d = .29$. Importantly, there were no interactions between group and framing, showing that medical students, despite their lower scores overall, were just as susceptible to framing context as psychology students. There was no main effect of gender, but it did interact with group, $F(2, 168) = 3.089$, $p = .048$, $\eta_p^2 = .035$. Male psychology students had higher IA scores than their female classmates ($M = 5.48$, $SD = 3.83$ vs. $M = 3.51$, $SD = 3.36$), but male and female medical students did not differ, ($M = 3.09$, $SD = 2.91$ vs. $M = 3.41$, $SD = 2.83$). There were no gender differences in UE scores, and gender did not interact with framing.

3.2. NZ Study

Cognitive-Perceptual (CP) and Interpersonal (IP) scale scores were analysed in a MANOVA with framing (psychiatric, personality, and creativity) and gender as between-subject factors. As in the UK study, a main effect of framing was observed, $F(4, 1322) = 3.431$, $p = .008$, $\eta_p^2 = .010$. Follow-up univariate tests showed an effect of framing on CP scores, $F(2, 661) = 6.275$, $p = .002$, $\eta_p^2 = .019$, but not on IP scores, $F(2, 661) = .843$, $p = .431$, $\eta_p^2 = .003$. Post-hoc Tukey tests showed that CP scores were lower with psychiatric framing than with either creativity, $p = .002$, $d = .31$, or personality, $p = .003$, $d = .32$, framing, which did not differ from each other, $p = .998$, $d = .01$. A main effect of gender, $F(2, 660) = 3.024$, $p = .049$, $\eta_p^2 = .009$ reflected higher CP scores in women ($M = 9.62$, $SD = 6.12$) than in men ($M = 8.45$, $SD = 5.86$). There were no gender differences in IP scores, and gender did not interact with framing.

4. Discussion

The present study explored the notion that framing (i.e., providing a psychiatric or healthy context to people completing schizotypy questionnaires) and knowledge about psychosis (i.e., testing psychology and medical students) might influence levels of self-reported schizotypal symptoms. This influence might originate from response tendencies that have been characterised as defensive responding (e.g. Claridge et al., 1983; Katsanis et al., 1990; Mohr & Leonards, 2005). Originally, defensive responding had been hypothesised from relatives of patients with schizophrenia who scored lower than (or equal to) controls on positive but not negative schizotypy (e.g. Appels et al.,

2004; Bora & Veznedaroglu, 2007; Calkins et al., 2004; Claridge et al., 1983; Clementz et al., 1991; Compton & Chien, 2008; Katsanis et al., 1990; Landin-Romero et al., 2016; Tarbox et al., 2012). Mohr and Leonards (2005) previously reported lower positive schizotypy scores in a group of psychology students having received a "psychiatry" instruction as compared to a group having received a "creativity" instruction. Supporting the notion that negative traits might be less salient and thus less prone to defensive responding, negative schizotypy did not differ between groups.

From previous studies, we could neither infer how existing knowledge about psychosis impacted responding nor whether our framing manipulation led to enhanced endorsement with the creativity instruction or reduced endorsement with the psychiatry instruction. In the two studies described here, we accounted for these previous limitations. The UK study replicates the original finding (Mohr & Leonards, 2005) that framing the O-LIFE questionnaire with a psychiatric context results in lower scores on positive schizotypy (UE scores), but not negative schizotypy (IA scores). This framing effect was found in psychology and medical students alike, although medical students had both lower UE and IA scores than psychology students. The NZ study replicates the framing effect, using a different measure of schizotypy (the SPQ), and extends the findings to support the defensive responding hypothesis: positive schizotypy scores did not differ between groups who read creativity and neutral personality-based instructions. Effect sizes for framing in the two studies are very similar (d = .36 in the UK study, d = .31 and d = .32 for the comparison of psychiatric framing to creativity and personality, respectively, in the NZ study), indicating a small to medium

sized effect. These and previous results indicate that defensive responding is not limited to one particular schizotypy questionnaire (Chapman scales: Mohr & Leonards, 2005; O-LIFE questionnaire: UK study; SPQ: NZ study). This conclusion is consistent with studies on relatives of patients with schizophrenia which show low rates of positive schizotypy on a range of scales (e.g., Appels et al., 2004; Bora & Veznedaroglu, 2007; Calkins et al., 2004; Claridge & Broks, 1984; Claridge et al., 1983; Clementz et al., 1991; Compton & Chien, 2008; Katsanis et al., 1990; Landin-Romero et al., 2016).

A priori, defensive responding seems most likely to occur for positive expressions of schizotypy; because they are salient enough to be recognized as such by the respondent (Franke et al., 1994), and are negatively loaded in public perception (e.g. Turkey: Boke et al., 2007; UK: Clement & Foster, 2008). Similar reasoning would also explain why negative schizotypy scores were unaffected by framing (see also Mohr & Leonards, 2005), and are comparable, or even higher (Appels et al., 2004; Compton & Chien, 2008; Bora & Veznedaroglu, 2007; Calkins et al., 2004; Clementz et al., 1991; Katsanis et al., 1990; Tarbox et al., 2012) in relatives of patients with schizophrenia when compared to those of controls. Negative symptoms or negative schizotypy (e.g. social and physical anhedonia, social withdrawal) will be less visible by their nature.

Another major finding was that medical students yielded lower scores than psychology students on both positive and negative schizotypy. Despite this major difference in overall reported schizotypy, framing effects were observed in both groups. Thus, defensive responding seems independent of people's current knowledge of

schizophrenia. The difference between groups could be interpreted in two ways. First, defensive responding might extend to negative schizotypy when individuals (i.e., medical students) have more refined knowledge about schizophrenia. Alternatively, it is also possible that medical students are generally lower in schizotypy than are psychology students, in the same general way that differences have been reported amongst other professions (Nettle, 2006; Rawlings & Locarnini, 2008). Regardless of the reason for their reduced levels of reported schizotypy, medical students are still similarly prone to framing effects. Only future studies can disentangle the above possibilities, e.g. by comparing groups known to be low vs. high in schizotypy (e.g., scientists vs. artists; Nettle, 2006; Rawlings & Locarnini, 2008), before and after framing manipulations.

Although the framing effects are remarkably consistent across studies, the observed gender differences are not. In the UK study, male psychology students had higher negative schizotypy scores than their female counterparts, although medical students did not show gender differences. In the NZ study, female psychology students had higher positive schizotypy scores than male students. There is no obvious explanation for these discrepancies, although it should be noted that gender effects in the NZ study are very small. Importantly though, gender did not interact with framing, suggesting that men and women are similarly affected. In contrast, Mohr & Leonards (2005) showed that male participants reported particularly low positive schizotypy after the psychiatry instruction. We do not have a strong theoretical rationale from which to

predict gender differences, and so all reported differences should be considered exploratory at this point.

In conclusion, we show that framing can result in defensive responding for salient (i.e. positive) features of schizotypy, and that this effect is also present in those with refined knowledge about psychosis (medical students). Thus, we should be concerned about response biases on schizotypy questionnaires that can occur in a similar self-protective direction as those reported in other domains such as pain assessment (Robinson et al., 1997), self-esteem (Forsman, 1993), and drug abuse (Carey, 2002). Although we doubt that researchers would deliberately establish a psychiatric context for participants, our experimental findings demonstrate that an individual's beliefs about the purpose of a schizotypy questionnaire can influence responding. To the extent that participants bring many of their own assumptions and beliefs to any research situation, our findings highlight the need to adopt procedures that minimise the influence of such beliefs. A more general concern is that defensive responding could lead to wrong conclusions regarding widely reported relationships between psychosis-proneness and behavioural correlates of schizotypy (see Cohen et al., 2015; Ettinger et al., 2015, for examples of possible relationships). The potential for defensive responding to skew results is therefore an important consideration. The present findings invite further study to determine how best to reduce (or control for) such response biases.

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Conflict of Interest

Authors report no conflicts of interest

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